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EXAMINER	
BOWMAN, MARY ELLEN	

ART UNIT	PAPER NUMBER
4174	

NOTIFICATION DATE	DELIVERY MODE
04/29/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/564,521	KIM ET AL.	
	Examiner	Art Unit	
	MARY ELLEN BOWMAN	4174	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 March 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :01/13/2006, 08/06/2007, and 03/07/2008.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statements (IDS) submitted on 01/13/2006, 08/06/2007, and 03/07/2008 were considered by the examiner.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

NOTE: Maeda is the English version of WO2003/032407, published April 17, 2003, cited in applicant's third IDS, which was filed on March 7, 2008.

4. Claims 1-3, 5, and 7-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al., EP 1,447,853 A1, published August 18, 2004 (hereinafter referred to as "Maeda") in view of Levinson et al., USPN 6,429,583 B1, published August 6, 2002 (hereinafter referred to as "Levinson").

5. Regarding claims 1, 5, and 12, Maeda teaches a light emitting device comprising (e.g., [0002]; “a known semiconductor light emitting device for emitting white-based light”): a light emitting chip (e.g., [0002]; “a near UV LED chip"); and a phosphor (e.g., [0002]; “a phosphor layer including a plurality of inorganic phosphors”) through which a first light emitting from the light emitting chip passes (e.g., [0049]; “the phosphor layer 2 absorbs the near UV emitted by the near UV LED 1 and converts it into white-based light”), wherein the phosphor comprises a silicate phosphor (e.g., [0026]; "in the semiconductor light emitting device...the yellow-based phosphor is preferably a silicate phosphor") exciting a second light having a first centered emission peak using the first light (e.g., [0028]; “the silicate phosphor…absorbs light of a wide wavelength…and has an emission peak in a…region of 550 through 600 nm”) and a phosphor exciting a third light having a second centered emission peak using the first light (e.g., [0023]; “a phosphor layer…for absorbing near ultraviolet emitted by the near ultraviolet light emitting diode...and the phosphor layer includes...a green-based phosphor for emitting green-based fluorescence having an emission peak in a wavelength region not less than 500 nm and less than 550 nm"; Note: The green emission peak generated by the green-based phosphor is the second emission peak generated by the first light.). Maeda further teaches the silicate phosphor is a yellow series (e.g., [0026]; “the yellow-based phosphor is preferably a silicate phosphor”).

6. Maeda fails to teach the chemical composition of the second phosphor.

7. Levinson teaches the phosphor comprises a sulfide phosphor (e.g., col 1, lines 42-44; “the phosphor composition comprises at least one of…$SrGa_2S_4:Eu^{2+}$”; NOTE: The foregoing chemical composition is a sulfide phosphor.). Levinson further teaches the sulfide phosphor has a chemical formula of $Sr_{3-x}Ga_2S_4:Eu^{2+}$, where $0.001 \leq x \leq 1$ (e.g., col 1, lines 42-44; “the

phosphor composition comprises at least one of…$SrGa_2S_4:Eu^{2+}$"). Levinson further teaches the sulfide phosphor is a green series (e.g., col 4, lines 33-34 and 42-44; "the green emitting phosphors preferably have peak emissions between about 500 nm and about 555 nm… [$SrGa_2S_4:Eu^{2+}$] has a peak emission at about 535-545 nm").

8. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a sulfide phosphor as the green emitting phosphor in a phosphor layer because the well known emission spectrum of the aforementioned sulfide phosphor demonstrates a peak emission at about 540 nm, which is within the green light wavelength range. Further, said emission peak serves to increase the spectral luminous efficacy of the light emitting device (Levinson: col 4, lines 44-48; "the resulting spectral luminous efficacy of the lamp...is typically greater"). Increasing the spectral luminous efficacy of the device is advantageous because the picture quality would be increased. Thus, reconstruction is desirable as taught by the prior art reference.

9. Regarding claim 2, Maeda and Levinson teach the invention as explained above regarding claim 1, and Maeda further teaches the first centered emission peak is in a range of 550-600 nm (e.g., [0023]; "a yellow-based phosphor for emitting yellow-based fluorescence having an emission peak in a wavelength region not less than 550 nm and less than 600 nm").

10. Regarding claim 3, Maeda and Levinson teach the invention as explained above regarding claim 1, and Maeda further teaches the second centered emission peak is in a range of 500-550 nm (e.g., [0023]; "a green-based phosphor for emitting green-based fluorescence having an emission peak in a wavelength region not less than 500 nm and less than 550 nm").

11. Regarding claim 7, Maeda and Levinson teach the invention as explained above regarding claim 1, and Maeda further teaches the phosphor has a particle size of $d_{90} \leq 20$ µm, 5 µm $\leq d_{50} \leq 10$ µm (e.g., [0058]; "in the silicate phosphor…the center grain size is preferably not less than 1 µm and not more than 20 µm and more preferably not less than 2 µm and not more than 10 µm").

12. Regarding claim 8, Maeda and Levinson teach the invention as explained above regarding claim 1, and Maeda further teaches the light emitting chip emits blue light (e.g., [0009]; "an inorganic LED...having an emission peak in the wavelength region ranging between blue violet and near UV").

13. Regarding claim 9, Maeda and Levinson teach the invention as explained above, and Maeda further teaches the phosphor is molded in a periphery of the light emitting chip or on the light emitting chip (e.g., [0046]; "the near UV LED 1 is sealed within a resin package containing phosphor particles").

14. Regarding claim 10, Maeda and Levinson teach the invention as explained above, and Maeda further teaches the phosphor is manufactured by mixing the phosphor with a light transmitting resin (e.g., [0046] and [0049]; "a phosphor layer 2 made of a resin including…phosphor particles," "the phosphor layer 2 absorbs the near UV…and converts it into white based light"; NOTE: "Absorbing" and "converting" light is equivalent to "light transmitting").

15. Regarding claim 11, Maeda and Levinson teach the invention as explained above, and Maeda further teaches the resin is an epoxy resin or a silicon resin (e.g., [0050]; a resin such as an epoxy resin…or a silicone resin…an epoxy resin and a silicone resin are preferred").

16. Claims 4, 13-14, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda in view of Levinson as applied to claim 1 above, and further in view of Park et al., *Application of Strontium Silicate Yellow Phosphor for White Light-Emitting Diodes*, Applied Physics Letters, Volume 84, Number 10, published March 8, 2004 (hereinafter referred to as "Park").

17. Regarding claim 4, Maeda and Levinson teach the invention as explained above regarding claim 1, but fail to teach the chemical composition of the silicate phosphor.

18. Park teaches the silicate phosphor has a chemical formula of $Sr_{3-x}SiO_5:Eu^{2+}$, where $0 < x \leq 1$ (e.g., Abstract; "to develop a yellow phosphor that emits efficiently under the 450-470 nm excitation range, we have synthesized a Eu^{2+} -activated Sr_3SiO_5 yellow phosphor").

19. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the aforementioned chemical compound as the silicate phosphor in a yellow based light emitting layer, because the use of said compound increases luminous efficiency (Park: p. 1649, par 3; "$Sr_3SiO_5:Eu$ developed in this work showed a higher luminous efficiency"), which can decrease power consumption and increase display quality. Thus, reconstruction is desirable as taught by the prior art reference.

20. Regarding claim 13, Maeda teaches a phosphor of a light emitting device (e.g., [0002]; "a known semiconductor light emitting device…composed of…a phosphor layer"), comprising: a silicate phosphor excited by a light (e.g., [0028]; "the silicate phosphor is a yellow-based phosphor...that has an excitation peak") generated by a light emitting chip (e.g., [0002]; "a near UV LED chip") and a second phosphor excited by the light generated by the light emitting chip (e.g., [0023]; "a near ultraviolet light emitting diode [LED chip] for emitting light…and a

phosphor layer for absorbing near ultraviolet light emitted by the [LED chip]….the phosphor layer includes…a green-based phosphor…and a yellow-based phosphor”).

21. First, Maeda fails to teach the chemical compositions of the two phosphors.

22. However, Levinson teaches a phosphor of a light emitting device, comprising: a sulfide phosphor excited by the light generated by the light emitting chip and having a chemical formula of $Sr_{1-x}Ga_2S_4:Eu^{2+}$, where $0.001 \leq x \leq 1$ (e.g., col 1, lines 37-44; “a light emitting diode…which emits blue light, and a phosphor composition which absorbs the blue light…and emits light…the phosphor composition comprises at least one of $SrGa_2S_4:Eu^{2+}$”).

23. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a sulfide phosphor as the green emitting phosphor in a phosphor layer because the well known emission spectrum of the aforementioned sulfide phosphor demonstrates a peak emission at about 540 nm, which is within the green light wavelength range. Further, said emission peak serves to increase the spectral luminous efficacy of the light emitting device (Levinson: col 4, lines 44-48; "the resulting spectral luminous efficacy of the lamp...is typically greater"). Increasing the spectral luminous efficacy of the device is advantageous because the picture quality would be increased. Thus, reconstruction is desirable as taught by the prior art reference.

24. Second, Maeda and Levinson teach the invention as explained above regarding claim 13, but fail to teach the composition of the silicate phosphor.

25. However, Park teaches a silicate phosphor having a chemical formula of $Sr_{3-x}SiO_5:Eu^{2+}$, where $0 < x \leq 1$ (e.g., Abstract; “to develop a yellow phosphor that emits efficiently under the 450-470 nm excitation range, we have synthesized a Eu^{2+} -activated Sr_3SiO_5 yellow phosphor”).

26. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the aforementioned chemical compound as the silicate phosphor in a yellow based light emitting layer, because the use of said compound increases luminous efficiency (Park: p. 1649, par 3; "Sr_3SiO_5:Eu developed in this work showed a higher luminous efficiency"), which can decrease power consumption and increase display quality. Thus, reconstruction is desirable as taught by the prior art reference.

27. Regarding claim 14, Maeda teaches a light emitting device (e.g., [0002]; "a known semiconductor light emitting device") comprising: a substrate (e.g., [0046]; "a sub-mount element 7"); a light emitting chip emitting a light (e.g., [0002]; "a near UV LED chip having an emission peak in a wavelength region of near UV"); a connection part (e.g., [0046]; "interface mounted") for electrically connecting the substrate (e.g., "sub-mount element 7") with the light emitting chip (e.g., [0046]; "near UV LED 1 is interface mounted on a sub-mount element 7"; NOTE: Interface mounted is equivalent to "electrically connected."); and a phosphor encapsulating the light emitting chip (e.g., [0046]; "the near UV LED 1 is sealed within a resin package containing phosphor particles") and through which the light passes (e.g., [0049]; "the phosphor layer 2 absorbs the near UV emitted by the near UV LED 1 and converts it into white based light").

28. First, Maeda fails to teach the chemical compositions of the phosphors.

29. However, Levinson teaches a sulfide phosphor contained in the phosphor and having a chemical formula of $Sr_{1-x}Ga_2S_4:Eu^{2+}$, where $0.001 \leq x \leq 1$ (e.g., col 1, lines 37-44; "the phosphor composition comprises at least one of $SrGa_2S_4:Eu^{2+}$").

30. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a sulfide phosphor as the green emitting phosphor in a phosphor layer because the well known emission spectrum of the aforementioned sulfide phosphor demonstrates a peak emission at about 540 nm, which is within the green light wavelength range. Further, said emission peak serves to increase the spectral luminous efficacy of the light emitting device (Levinson: col 4, lines 44-48; "the resulting spectral luminous efficacy of the lamp...is typically greater"). Increasing the spectral luminous efficacy of the device is advantageous because the picture quality would be increased. Thus, reconstruction is desirable as taught by the prior art reference.

31. Second, Maeda and Levinson teach the invention as explained above regarding claim 14, but fail to teach the composition of the silicate phosphor.

32. However, Park teaches a silicate phosphor contained in the phosphor and having a chemical formula of $Sr_{3-x}SiO_5:Eu^{2+}$, where $0 < x \leq 1$ (e.g., Abstract; “to develop a yellow phosphor that emits efficiently under the 450-470 nm excitation range, we have synthesized a Eu^{2+} -activated Sr_3SiO_5 yellow phosphor”).

33. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the aforementioned chemical compound as the silicate phosphor in a yellow based light emitting layer, because the use of said compound increases luminous efficiency (Park: p. 1649, par 3; “Sr_3SiO_5:Eu developed in this work showed a higher luminous efficiency”), which can decrease power consumption and increase display quality. Thus, reconstruction is desirable as taught by the prior art reference.

34. Regarding claim 17, Maeda teaches a light emitting device (e.g., [0002]; “a known semiconductor light emitting device”) comprising: a leadframe (e.g., [0046]; “a lead frame 8”); a light emitting chip emitting a light (e.g., [0002]; “a near UV LED chip having an emission peak in a wavelength region of near UV”); a connection part for electrically connecting the leadframe with the light emitting chip (e.g., [0046]; “a near UV LED is interface mounted on a cup 9 provided on a mount lead of a lead frame 8”); and a phosphor encapsulating and molding the light emitting chip (e.g., [0046]; “the near UV LED 1 is sealed within a resin package containing phosphor particles”) and through which the light passes (e.g., [0049]; “the phosphor layer 2 absorbs the near UV emitted by the near UV LED 1 and converts it into white based light”).

35. First, Maeda fails to teach the chemical compositions of the phosphors.

36. However, Levinson teaches a sulfide phosphor contained in the phosphor and having a chemical formula of $Sr_{1-x}Ga_2S_4:Eu^{2+}$, where $0.001 \leq x \leq 1$ (e.g., col 1, lines 37-44; “the phosphor composition comprises at least one of $SrGa_2S_4:Eu^{2+}$”).

37. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a sulfide phosphor as the green emitting phosphor in a phosphor layer because the well known emission spectrum of the aforementioned sulfide phosphor demonstrates a peak emission at about 540 nm, which is within the green light wavelength range. Further, said emission peak serves to increase the spectral luminous efficacy of the light emitting device (Levinson: col 4, lines 44-48; "the resulting spectral luminous efficacy of the lamp...is typically greater"). Increasing the spectral luminous efficacy of the device is advantageous because the picture quality would be increased. Thus, reconstruction is desirable as taught by the prior art reference.

38. Second, Maeda and Levinson teach the invention as explained above regarding claim 17, but fail to teach the composition of the silicate phosphor.

39. However, Park teaches a silicate phosphor contained in the phosphor and having a chemical formula of $Sr_{3-x}SiO_5:Eu^{2+}$, where $0 < x \leq 1$ (e.g., Abstract; "to develop a yellow phosphor that emits efficiently under the 450-470 nm excitation range, we have synthesized a Eu^{2+} -activated Sr_3SiO_5 yellow phosphor").

40. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the aforementioned chemical compound as the silicate phosphor in a yellow based light emitting layer, because the use of said compound increases luminous efficiency (Park: p. 1649, par 3; "Sr_3SiO_5:Eu developed in this work showed a higher luminous efficiency"), which can decrease power consumption and increase display quality. Thus, reconstruction is desirable as taught by the prior art reference.

41. Claims 6 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda in view of Levinson as applied to claim 1 above, and further in view of Hase et al., USPN 4,631,445, published December 23, 1986 (hereinafter referred to as "Hase").

42. Regarding claim 6, Maeda and Levinson teach the invention as explained above regarding claim 1, but fail to teach the ratio of the phosphors.

43. Hase teaches the silicate phosphor and the sulfide phosphor exist at a ratio of 1:1 to 1:9 (e.g., col 4, lines 61-63; "10 to 40% by weight of the silicate phosphor and from 10 to 50% by weight of the...sulfide phosphor"; NOTE: The aforementioned percentages are equivalent to a ratio of 1:1 to 1:5.).

44. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the two phosphors in the above listed weight percentages, because the above described ratios of silicate phosphor and sulfide phosphor obtain a pure white light emitting color (Hase: col 4, lines 56-63; "in order to obtain a white emitting color…the present invention is selected"). The purpose of the invention disclosed in the primary prior art reference, Maeda, is to produce a white light emitting device. Thus, reconstruction is desirable as taught by the prior art references.

45. Regarding claim 18, Maeda teaches a light emitting device (e.g., [0002]; "a known semiconductor light emitting device") comprising: a light emitting chip emitting a light (e.g., [0002]; "a near UV LED chip having an emission peak in a wavelength region of near UV"); and a resin-based phosphor (e.g., [0046]; "the near UV LED 1 is sealed within a resin package containing phosphor particles") through which the light emitting from the light emitting chip passes (e.g., [0049]; "the phosphor layer 2 absorbs the near UV emitted by the near UV LED 1 and converts it into white based light"); wherein the phosphor comprises a yellow silicate phosphor (e.g., [0026]; "in the semiconductor light emitting device...the yellow-based phosphor is preferably a silicate phosphor") exciting a second light having a first centered emission peak using the first light (e.g., [0028]; "the silicate phosphor…absorbs light of a wide wavelength…and has an emission peak in a…region of 550 through 600 nm").

46. First, Maeda fails to teach a green sulfide phosphor and its ratio to the silicate phosphor.

47. However, Levinson teaches a green sulfide phosphor exciting a third light having a second centered emission peak using the first light (e.g., col 4, lines 17-24; "the LED produces a

blue light which is converted by the phosphor composition 230 to green light...one or more of the following phosphors are used...$SrGa_2S_4:Eu^{2+}$").

48. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a sulfide phosphor as the green emitting phosphor in a phosphor layer because the well known emission spectrum of the aforementioned sulfide phosphor demonstrates a peak emission at about 540 nm, which is within the green light wavelength range. Further, said emission peak serves to increase the spectral luminous efficacy of the light emitting device (Levinson: col 4, lines 44-48; "the resulting spectral luminous efficacy of the lamp...is typically greater"). Increasing the spectral luminous efficacy of the device is advantageous because the picture quality would be increased. Thus, reconstruction is desirable as taught by the prior art reference.

49. Second, Maeda and Levinson teach the invention as explained above regarding claim 18, but fail to teach the ratio of the two phosphors.

50. However, Hase teaches the green sulfide phosphor and the yellow silicate phosphor exist at a ratio of 1:2 to 1:5 (e.g., col 4, lines 61-63; "10 to 40% by weight of the silicate phosphor and from 10 to 50% by weight of the...sulfide phosphor"; NOTE: The aforementioned percentages are equivalent to a ratio of sulfide phosphor to silicate phosphor that is 1:1 to 1:4.).

51. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the two phosphors in the above listed weight percentages, because the above described ratios of silicate phosphor and sulfide phosphor obtain a pure white light emitting color (Hase: col 4, lines 56-63; "in order to obtain a white emitting color…the present invention is selected"). The purpose of the invention disclosed in the primary prior art reference,

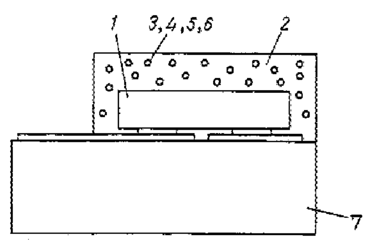
Maeda, is to produce a white light emitting device. Thus, reconstruction is desirable as taught by the prior art references.

52. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda in view of Levinson and Park, as applied to claim 14 above, and further in view of Hase.

53. Regarding claims 15 and 16, Maeda, Levinson, and Park teach the invention as explained above regarding claim 14.

54. Maeda further teaches the light emitting device is a top view type (e.g., [0076]; "a surface emitting illumination apparatus"). Maeda also teaches the light emitting device is a side view type (e.g., Figure 1; the phosphor layer 2 extends to the edge of the substrate 7 and is therefore capable of being a side view type device).

FIG. 1



55. Maeda, Levinson, and Park fail to teach the ratio of the silicate and sulfide phosphors.

56. Hase teaches the silicate phosphor and the sulfide phosphor exist at a ratio of 1:2 to 1:3 (e.g., col 4, lines 61-63; "10 to 40% by weight of the silicate phosphor and from 10 to 50% by weight of the...sulfide phosphor"; NOTE: The aforementioned percentages are equivalent to a ratio of 1:1 to 1:5.). Hase further teaches the silicate phosphor and the sulfide phosphor exist at a ratio of 1:3 to 1:4 (e.g., col 4, lines 61-63; "10 to 40% by weight of the silicate phosphor and

from 10 to 50% by weight of the...sulfide phosphor"; NOTE: The aforementioned percentages are equivalent to a ratio of 1:1 to 1:5.).

57. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the two phosphors in the above listed weight percentages, because the above described ratios of silicate phosphor and sulfide phosphor obtain a pure white light emitting color (Hase: col 4, lines 56-63; “in order to obtain a white emitting color…the present invention is selected”). The purpose of the invention disclosed in the primary prior art reference, Maeda, is to produce a white light emitting device. Thus, reconstruction is desirable as taught by the prior art references.

58. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda in view of Levinson and Hase, as applied to claim 18 above, and further in view of Hohn et al., USPN 6,066861, published May 23, 2000 (hereinafter referred to as “Hohn”).

59. Regarding claims 19 and 20, Maeda, Levinson, and Hase teach the invention as explained above regarding claim 18, but fail to teach the ratio of the phosphor with respect to the base material.

60. Hohn teaches the phosphor is contained at a ratio of 15-30 wt% with respect to the base so as to emit white light (e.g., col 10, line 42; “luminous substance pigments > 0 and $\leq 25\%$ by weight”). Hohn further teaches the phosphor is contained at a ratio of 5-15 wt% with respect to the base so as to emit bluish light (e.g., col 8, line 12; “luminous substance pigments… $\leq 15\%$ by weight”).

61. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the above percentages of phosphor to control the emission of light from a

device, because changing the composition of the phosphor layer to include more or less phosphor within the known preferred range allows for the control of the conversion of light (Hohn: col 11, lines 13-19; "said luminous substance pigments converting a portion of the radiation....into radiation of a higher wavelength"). Certain applications desire white light and others desire blue light, so the ability to control the conversion of light is clearly beneficial. Thus, reconstruction is desirable as taught by the prior art reference.

Conclusion

62. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARY ELLEN BOWMAN whose telephone number is (571)270-5383. The examiner can normally be reached on Monday-Thursday, 6:30 a.m.-5:00 p.m. EST.

63. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly D. Nguyen can be reached on (571) 272-2402. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

64. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./
Examiner, Art Unit 4174

/Jacob Y. Choi/
Primary Examiner